[Poster Board # 818] Time Course Of Diaphragm Function Recovery After Controlled Mechanical Ventilation In An Animal Model, [Publication Page: A2718]

D. Thomas, PhD student, K. Maes, PhD, A. Agten, PhD, M. Decramer, MD, PhD, G. Gayan-Ramirez, PhD
Leuven/BE
Respiratory Muscle Unit

Rationale: Although it has been previously shown that controlled mechanical ventilation (CMV) results in rapid and severe diaphragmatic dysfunction, the recovery response of the diaphragm to normal function after CMV is not known. Therefore, in this study, we examined the time-course of diaphragm function recovery in an animal model of CMV.

Methods: Healthy male Wistar rats were anesthetized and submitted to either 24-27h of CMV or to 24h of CMV followed by 1h, 2h or 3h of spontaneous breathing (CMV + 1h SB, CMV + 2h SB, and CMV + 3h SB, respectively).

Results: No differences were observed in blood pressure, blood gases, body weight or muscle weights between the four groups. In the CMV, CMV + 1h SB and CMV + 2h SB groups, the *in vitro* diaphragm force-frequency curve was similar. However, compared to the other groups, diaphragm force was significantly improved after 3h of SB following CMV (eg, maximal tetanic force: +29% vs CMV, $p<0.01$), and almost reached control values. Also, the cross-sectional area (CSA) of the type IIx/b diaphragm fibers was significantly increased in the CMV + 3h SB group (eg, +27% vs CMV, $p<0.05$), while the CSA of the type I and type IIa fibers was similar in all groups. Furthermore, no differences were observed in diaphragm protein oxidation, lipid peroxidation, and activities of the proteolytic enzymes calpain and caspase-3 between the four groups. For the influx of inflammatory cells, no differences were present in the amount of ED1+ or ED2+ macrophages in the diaphragm between the different groups, although a significant increase in the amount of neutrophils was observed after 3h of SB following CMV (+59% vs CMV, $p<0.05$).

Conclusions: The data of this study show that reloading the diaphragm for 3h after CMV, in rats, is sufficient to result in a significant improvement of diaphragm force and an increase in the CSA of the type IIx/b muscle fibers. No changes were observed in the activities of calpain and caspase-3, oxidative stress or influx of macrophages in the diaphragm. The increased influx of neutrophils in the diaphragm, after 3h of SB following CMV, seems not to be harmful since diaphragm contractile properties were improved.

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Session Info: Poster Discussion Session - Poster Presentation, [B30] MECHANISMS OF MUSCLE WEAKNESS IN CRITICAL ILLNESS: TRANSLATING BASIC SCIENCE TO THE BEDSIDE
Day/Date: Monday, May 21, 2012
Session Time: 8:15 AM - 10:45 AM
Poster Viewing: 8:15 AM - 9:15 AM
Discussion: 9:15 AM - 10:45 AM
Room: Room 3010-3012 (West Building, Level 3), Moscone Center